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T H E S I S on

PUBLIC HEALTH METHODS IN THE COLONY OF THE

CAPE OF GOOD HOPE.

Written for M. D. (Edin.)

by

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PUBLIC HEALTH METHODS
in the
Colony of the Cape of Good Hope.

INTRODUCTION.

It has been stated that the incidence of Enteric Fever is "everywhere the measure of the sanitary intelligence of a community."

If this be so, the state of things prevailing in South Africa indicates an appalling lack of hygienic understanding. Enteric Fever is, in many parts, a veritable scourge, for the returns do not show anything like the true number of cases; many are never seen by a medical man, and the notification of all infectious diseases is in a very lax state. In 1903 outbreaks occurred in all districts of the Cape Colony, except twenty; 1785 cases were reported, 1131 Europeans and 654 natives. Probably more than twice this number escaped notification, as may be judged from the disproportionate incidence upon "white" and "coloured." The words of the Chairman of the Local Government Board, to whom the writer suggested some sanitary reforms afford some indication of popular feeling in the matter; he said "It is the Lord's will and we cannot prevent it."

Whilst it is true that both the diagnosis and treatment of Enteric Fever are more difficult in the circum-



stances obtaining where the writer's cases occurred, than in those at home in England where skilled medical assistance, skilled nursing, and facilities of access to clinical laboratories are all at hand, it is, nevertheless, but a matter of time and experience to enable the young practitioner effectively to employ in individual cases, the accumulated skill of the profession as taught by professors and textbooks. It is not enough, however, to be able to treat particular cases. With the disease at their gates, people are induced to ask, why they are attacked, and how it may originate. And the practitioner, whilst making every effort to trace the source of any given epidemic, or sporadic case, is driven, in the interest alike of the patient and of the Public Health, to emphasise the paramount importance of prophylaxis.

It was in this way the writer was led to a detailed study of the defects, and a consideration of possible improvements, in the Public Health Methods of Cape Colony.

When the M.O.H. of the Cape Colony published his annual report in 1896, it contained a series of statistics dealing with the general health of the community, which proved to be of so alarming a character that legislation of a drastic character was deemed imperatively necessary. A Bill to Amend the Act of 1883 was brought forward by Dr. Te Water in the session of 1897. A glance at the two Acts in question will at once show that a great advance was made. The Act of 1883 was replaced, in great measure, but was materially added to. It gave greater power to the Urban Authorities and to the Central Government, in the latter case more especially with a view to the exercise of more efficient sanitary control over areas not directly under the jurisdiction of local governing bodies. Great things were hoped for as a result of the Bill; but though no doubt it has been of considerable service in promoting the cause of public health, experience has proved that it is of little practical value. Certainly a great deal has been done since the passing of the Act; but by comparison with the amount of legislation that is placed upon the Statute books of Great Britain in the Health Acts, and the amount of real good that has accrued from it, the paucity of the legislation in an important

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Report of M.O.H. of Colony on Public Health 1896, 1903.
Annual Reports of District Surgeon & Local Authorities 1903.
Report of M.O.H. for Cape Town 1906.
Registrar-General's statistics 1904 & 6.
Public Health Acts.

Colony and the apathy in its administration is appalling.

The Public Health of the Colony is officially under the head of the Colonial Office - the Colonial Secretary. The M.O.H. for the Colony occupies an indefinite official position, being nominally an Advisory, but in fact largely an Administrative, officer. The professional staff consists of the M.O.H., an assistant M.O.H., a Bacteriological Assistant, and a Medical Inspector. Last session the draft estimates provided for the appointment of an additional assistant, but owing to retrenchment on the part of the Government the item was rejected in spite of the urgent recommendations of the Colonial Secretary.

The duties which the Office is called upon to perform are multifarious. During the year under review the Office dealt with 20,000 letters and 7,000 telegrams, 98 large batches of regulations and consultations on 1,193 separate subjects, - Measures for the suppression of the plague including cleansing and disinfecting operations.

Dealing with outbreaks of Small Pox and infectious diseases generally.

Reports on Sanitary Systems of local bodies.

The control of native locations.

Inspection of Hospitals.

The management of the Cape Town morgue.

Inspection of Hospitals.

Bacteriological Work.

The compilation of Statistics, and lately

The Administration of the Immigration Restriction Act.

Advising Government and local Authorities on matters
connected with Public Health, Sanitation,
Contagious Diseases, Leprosy, Convict Stations
and Prisons, Cemeteries, &c.

(The above do not include all the duties of this exceedingly
overworked and underestimated office. It is too much
for such a Staff to undertake, and nothing but a low
estimation of the importance of the subject can excuse
the refusal of another assistant, retrenchment notwith-
standing.

Only two Local Authorities - Cape Town and Kimberley -
appoint a M.O.H. who gives his whole time to the work.
About a dozen others employ a local practitioner in an
advisory capacity. In every district in the Colony one
practitioner is paid a small yearly salary by the Govern-
ment as District Surgeon, one of whose duties it is to
furnish an annual report on the lines of the official
circular annexed. (Appendix I.) Such is the administration
of Public Health in the Cape Colony with a population
of over two millions. An overworked, disgracefully under-
manned, and incidentally underpaid, Health Office in
Cape Town; two M.O's.H., a dozen or less advisory medical
men, and nothing else. This being so it is not surprising

that the sanitary condition of the Colony is in a lamentable state, and an analysis of the published returns from 100 districts prove this expectation correct. Neglecting the native territories, Cape Town and Kimberley, one may consider only the usual up-country Dorp with populations varying between 1,500 and 120,000, or, i.e., with an average of 10,000 inhabitants "white" and "coloured." There is no need to subdivide these Dorps into urban and rural, for while it may be said that generally the smaller the Dorp the less attention paid to sanitation and public health, still the state of collective and individual apathy and the standard of domestic hygiene are the same.

Published returns or reports of the District Surgeons show to what an alarming extent the fundamentals of Sanitation and Public Health are neglected. With the Act as it stands, Government is powerless to intervene. Experience shows that cajolery and persuasion are hopeless, and nothing but an Amended Public Health Act, which makes provision for sanitary control and which replaces the present "may" by a "must," will be of any avail.

Some idea of the nature of this stolid indifference may be gathered from the remark of the District Surgeon for Port Elizabeth, population 36,017. - "Bubonic Plague and Small Pox have been blessings in disguise as the town, in consequence, has had a thorough cleansing." Their water course may be "appallingly filthy and redolent with stenches" (District Surgeon's report). "Paunches of

stock lie in the ravine till rotten:" these things and hundreds as bad do not rouse them one bit; but it is interesting to note that an outbreak of Bubonic Plague and Small Pox does stir them into some activity.

In reply to question (a) (Appendix I) I have tabulated the replies as follows:-

Good, satisfactory, and needing no improvement.	20	} 26%
Good, but still needing improvement.	6	
Risky, but no illness traceable to it.	14	} 58%
Polluted in transit.	22	
Polluted and filthy.	17	
Bad, complained about previously.	5	
Not reported.	16	

Leaving out those places not mentioned in the reports, 58% have a risky or bad water supply. The 22 polluted in transit are all pure at the source, indeed most water in South Africa, especially up-country, is pure at its source and only becomes contaminated in transit. In all 22 the condition is remediable in some cases by laying pipes, in others by protecting the furrows or wells. The following are some of the remarks made with reference to the water.- "Geese, fowls and pigs wallow in the furrow." "Horses and animals drink from and walk in the furrows." "Filth of all sorts obstructs the furrows and causes stagnant pools of bad smell." "No doubt the cause of the epidemic of diarrhoea." "The pollution of the water supply is steadily progressive": in one case the

District Surgeon shows an experience of South African affairs when he says: "The water is, of course, polluted." "Native excreta gets in the water." "Water is liable to spread infection." Shows Bac.Coli Com. in large numbers." Every one of the 58 makes some such remark. There is no reason for this shocking state of affairs, in most cases the most elementary precaution is all that is needed, and could be applied without necessitating any great expense. It is due to carelessness, apathy and that laissez-faire policy which characterises all South African municipalities and Boards of management; nothing short of stern legislative command will alter it.

Question (b) (Appendix I.) on sewerage and drainage elicits the following replies with reference to night-soil and refuse.

Removed by carts and dealt with satisfactorily	16.
Disposed of in an unsatisfactory manner	38.
Not reported	12.
No system, disgraceful and a menace	34.

Here only 16% give a satisfactory reply to such an important question. The remarks under this heading are many and forcible; they are repeated year after year by the District Surgeon and no notice is taken of them. Taking a few at random: "The night-soil is flushed into a spruit which is used by the natives for drinking." "The collection is inefficient and disgusting." "The befouling of the streets by dirt, filth, human and animal

excrement is a serious menace to Public Health." "The village is undermined with cesspools." "Natives leave their excreta all over the place; and when dried and dispersed by the wind we eat it, drink it, and breathe in it." This place has a death rate of 80 per 1,000 mostly from gastro-intestinal disorders - a death rate comparable to Great Britain two centuries ago - and this in what ought to be a health resort as far as climate and surroundings go. "The disposal of excreta is horrible to contemplate." There are many remarks similar to the above made, be it understood, not for the first time. It is no wonder that many District Surgeons are condensing their reports into a laconic "Nothing to add to last year's answers."

Similar commentaries are made upon nuisances generally and upon the native locations.^x Camps more filthy and more crowded than the worst slum in a big city, yet with miles of veldt at their disposal, abundance of water and, with the present demand for native labour, every chance of becoming, for them, rich. The appalling mortality among the coloured urban population, especially among infants, must continue until this state of things is remedied.

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Bad, no supervision	45.
Good and clean	26.
None	16
Not reported	13.

It is not surprising then that outbreaks of infectious disease should be many and serious. They are sufficiently grave to awaken the public to a sense of the urgent necessity for the introduction of some better system of sanitary administration. It is instructive, too, to consider the ravages of such diseases as Typhoid and Tuberculosis as showing how much more must yet be done to protect the health of the public.

Small Pox is mild in South Africa, and the death rate is low. Among the unvaccinated only 4% of those who contract the disease die. The total number of outbreaks during the year was 332, involving 57 separate districts. The total number of cases 1,815, of which 457 had been previously vaccinated, and 1,358 were unvaccinated. The total number of deaths was 70. Eleven among the vaccinated and 59 unvaccinated. The case mortality among the vaccinated was therefore 2.41%, and among the unvaccinated 4.34.

Vaccination is well carried out in the Colony. It does not depend upon local authorities but on the central authority - the Colonial Office in Cape Town. This office instructs the District Surgeon direct to undertake a tour of his district, supplies him with lymph from the Grahams-town Institute, and requires returns of the number vaccinated. On the ground of expense, however, a journey to determine the successful vaccinations is rarely allowed, so that there is no means of telling whether the District

is well vaccinated or not, or whether the lymph supplied is active or not. The public, too, is alive to the danger of Small Pox, and generally the local authorities take an intelligent interest in its suppression. In a small community, of which I was Health Officer, a case of Small Pox was imported- a coloured man from a neighbouring location. All the white population submitted themselves voluntarily for vaccination and re-vaccination, and the coloured were coerced to submit. The patient was isolated and guards placed. His hut, clothing and belongings were burnt. No further case occurred.

But Enteric Fever is the most serious infectious disease that South Africa has to deal with. It is ubiquitous, and every country practitioner at the beginning of the Typhoid season in his District, makes up Winchester quarts of the particular medicine which he is in the habit of employing. During the year there was an outbreak in two out of every three districts in the Colony. Owing to defective notification it is impossible to say to what extent it prevails - a large number of cases, moreover, never come under observation. 1,785 cases were notified - 1,131 European and 654 Coloured. This disproportion shows that many cases among the coloured are never reported. The rate of mortality is 6.50 per 10,000 for Europeans and 11.52 for coloured, or 8.82 for all races. This is among Europeans 3 times, and among natives 6 times as high as it is in England. If Typhoid Fever is

more

"everywhere the measure of the Sanitary intelligence of a community," we need no further evidence that such intelligence in South Africa is at a very low ebb.

With regard to Diphtheria, our white population is 3 times, and our native 4 times, as liable to Diphtheria as are people in England. 1,249 cases have been notified, but do not, of course, represent by any means the total number of cases which occurred.

It is only possible to refer, in passing, to such a large subject as the plague of which Dr. Gregory gives a very instructive history. Apparently the ordinary methods of dealing with rats are futile, and the only really effective method is one which, unfortunately, does a great deal of damage to property and can only be applied when ships are empty. The risk of plague has lately been increased by the introduction of Chinese into the Transvaal.

With regard to Tuberculosis, Dr Gregory says: "In my opinion Tuberculosis is going to be in future the great scourge of the native and coloured population of the Colony. Nor do I well see how the rapid spread of this disease is to be prevented under the existing standard of domestic hygiene which prevails among them." There has been a great increase in the number of Tubercular diseases in the Colony, particularly pulmonary phthisis, until it has become a serious problem. Public lectures have been given in Cape Town by prominent medical men,

and the newly formed "Association for the prevention of Consumption" have waited on the Colonial Secretary to ask for legislation, to prevent spitting and to get better cleaning of railway carriages, also to amend the Immigration Act so as to make it impossible for those in an advanced state of phthisis to land. Considering that phthisis was, 20 years ago, a very rare disease, the mere formation of such an Association as the above shows the strides the disease must have made. From the published tables of death from Tuberculosis it is seen that in 1896 the mortality for All Races was 3.77 per 1,000 and in 1900 5.15. The coloured population mortality has increased from 5.58 per 1,000 in 1896 to 7.59 in 1902. These figures are for the urban districts of the Colony. Roughly the mortality is among the coloured 4 times as great as in England. The general impression is that this increase in the spread of Tuberculosis is due to the number of persons with advanced phthisis who seek South Africa as a health resort for their complaint. There is no doubt that the landing of such persons and their living in hotels and boarding-houses does tend to propagate the disease; but to a great extent the general insanitary condition of the Colony, the overcrowding and the almost universal habit of spitting which obtains, are powerful causative factors. Men, women and children, white and coloured, herd in small rooms, sleep, eat and work in them, and all spit in the most disgusting manner. They

spit upon one's person, clothing and carpet promiscuously, and a most important part of the Surgery equipment is a notice in Dutch - "Please do not spit."^x

Consumption is now a notifiable disease just as is Small Pox, and in his Health Report for the City of Cape Town, Dr Anderson bears testimony to the satisfactory way in which this notification has worked out and the entire absence of any hardship or friction.

Other points which call for mention are the spread of Erysipelas, the prevalence of puerperal fever and the necessity for exercising stricter control over the practice of Midwifery, while in addition, Leprosy, the Causative Disease Acts, dagga-smoking as a cause of crime, show problems sharply differentiated from those confronting Public Health workers elsewhere.

The foregoing is enough to show conclusively that the Public Health of the Colony is in a parlous state. The inadequate acts are a dead letter, and one cannot speak of a sanitary condition of the Colony generally, and

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I have known several cases of phthisis to originate as it were spontaneously. One girl (Miss van A., aged 17, Boer) who was living on a farm far removed from any village and several hours' journey from any neighbouring farm, consulted me for Haemoptysis. Her father and mother, two brothers and one sister were alive and particularly robust people - almost giants, and she herself was above the average height and weight. None of the family had died, and there was no phthisis nearer than 36 miles, where she had never visited. There was no doubt from the physical signs that she was suffering from incipient phthisis in the right apex. On enquiry I found that her father and mother, married brother and his wife, and the patient herself all slept in one room. (They were well-to-do people.)

the need for reform is imperative and urgent. Whatever is done, there are great difficulties to contend with; but there is no reason to anticipate that a rational solution of the difficulty is invested with unsurmountable obstacles. Apart from the apathy of municipalities and boards, which is after all but a reflection of the apathy of the individual, every bit of legislation is made a party question. The Premier, the Minister for public works, the Speaker of the House of Assembly, and about 12 other members are all medical men; but some idea of the determined opposition any proposed Public Health Amendment Act would encounter may be gathered from the way the Scab Act was received. The Scab Act is a veterinary Health Act and provides for the compulsory dipping of sheep at stated intervals. It has worked wonders; scab is nearly eradicated in the Colony, the mortality among sheep is greatly lessened and the wool and skins increased in quality and price. Yet to this day the platform cry of "No Scab Act" will always gain a certain number of votes. In every District of the Colony there is a salaried Scab Inspector whose duty it is to see the provisions of the Act carried out. Sheep-dip is supplied to farmers at cost price and carried over the rails free. It has been costly to work, has met with great opposition

The windows were never opened and the room never thoroughly cleaned. I had a hut built for her outside, of matting, stretched over a framework of wood. She slept in this for 6 months and was as far as I could then detect completely cured. She continued to live in the hut because

and yet has triumphed and justified its promises. In the country just now money is scarce, and the necessity for adopting the precautions preached by doctors is not always obvious any more than it is in some parts of Great Britain. Disease must be combatted at its source and the first things to see to are the proper supply of water, the disposal of refuse, slop-water and night-soil, the control of crowded tenements and native locations, and the arrangements for the slaughter of animals and for sale of food.

Clearly an Amended Public Health Act is necessary to deal with these matters; but, above all, a constant effort is necessary to arouse and maintain popular interest and vigilance. Then, at present, there is no uniformity in the Regulations. The Government under Circular 22 of 1899 adopted a set of Model Regulations which had been framed by the M.O.H. of the Colony for the guidance of Municipalities and Village Management Boards, but only about one-half of the Municipalities and one-seventh of the Village Management Boards have adopted them and the Government has no authority under the existing Act to enforce them. Cape Town is one of the municipalities

she said she preferred it, and one year after her first symptoms was quite free from any disease. On enquiries since I have heard that she is married and well - 3 years from when I first saw her. I have known other cases which could only be attributed to overcrowding but they have not ended so happily.

which has not accepted the Regulations, but Cape Town has a thoroughly efficient M.O.H. devoting his whole time to the work, whereas in no other town, except Kimberley, is there a M.O.H. who is solely retained for matters of Public Health and sanitation. In any case no city would suffer from the enforcement by statute of the model regulations referred to, and if statutory power is to be given at all it must be generally applicable.

Of the existing Acts that of 1883 deals chiefly with quarantine, vaccination and cemeteries. That of 1897 says that every local authority shall make byelaws or regulations for the suppression of nuisances and for the preservation of Public Health. For compelling residents to keep their premises free from offensive, infectious and unwholesome matters, for the protection from pollution of water for drinking purposes, and for levying of rates. If the local authority fails to do this the Minister may order it to be done, and if this order is disobeyed the Governor may proclaim regulations in the Gazette. As a matter of fact, the majority of local authorities do not make any such byelaws or regulations, and the Minister and Governor have never intervened. Here is the first need for reform. The adoption of model regulations, or such regulations altered to meet individual exigences, should be made compulsory at once in every District of the Colony. If not so adopted the Colonial Secretary

must order their adoption and the Governor must proclaim them law by publication in the Gazette. The publication of the District Surgeons' yearly reports would then have some meaning, since the offences committed would be punishable. A Sanitary Inspector should be compulsory just as a Scab Inspector now is, and preferably he should be a man from another district. In small communities neighbours do not like to complain, but I venture to think that a few prosecutions by the Sanitary Inspector would speedily remove the most glaring offences. The staff of the head office in Cape Town should be increased by two assistants, one to reside permanently and one to travel and pay surprise visits to the different districts and reside in each place sufficiently long to acquaint himself with the working of the regulations. He would be assisted by the District Surgeon and would, on subsequent visits, be able to compare the progress made in sanitation in any one place, and to contrast this with the zymotic death rate.

Opposition would be offered to these amendments on the ground of expense. But public health must be paid for. The Scab Act has cost a great deal of money, yet it is now acknowledged that it was well spent. Most districts are very lightly taxed, and many not at all. But above all the people must be made intelligent co-operators. They must be taught that better sanitation, better domestic hygiene and cleaner living generally means increased

health to themselves and to the community.

"Since the water has been brought in pipes and the open furrow abolished there has been no case of Enteric Fever." "Ever since the adoption of better sanitation there has been no case of Enteric Fever." Both statements from District Surgeons' reports are powerfully persuasive arguments. Striking indeed are the figures to be deduced from the report of the M.O.H. for Cape Town as to the influence of a sound sanitary administration on the health of a community. Even the most obtuse of laymen cannot fail to be struck with records which show a progressive diminution in mortality during the occupancy of the position of M.O.H., a result which, although due credit must be given to the influence of an able head of affairs, is largely to be set down to the credit of the change of system which substituted a whole-time official for one who was a general practitioner. A drop from the gross Death Rate of 37 in 1892 to 11 in 1906 is an object lesson which Municipal Councils should ponder over, and would ponder over if they knew about it. But Municipalities and Village Management Boards do not read Blue-books, and do not know when improved sanitation and decreased death rate go together whether it is post hoc or propter hoc. Hence the necessity for an Educative Crusade. Unfortunately most country practitioners are unable to deliver popular lectures upon such matters owing to the difficulty of language. To give a lecture on a scientific subject in

language which is intelligible to the average bucolic layman is difficult enough but to do it in Cape Dutch is nearly an impossibility. It could, however, be made plain by such means that those places which have done something, however little, towards improvement in their sanitary affairs are freer from epidemics and show a lower death rate. The appointment of a Sanitary Inspector, the improvement of the water supply and attention to removal of night-soil and slop-water is, though little enough, followed in many instances by a lower death rate from zymotic disease and an improved state of health of the community, as the table (Appendix III) will show.

Generally where these matters are neglected, outbreaks have been serious. Some advance would have been made if these fundamental matters could be ameliorated; but certain points, not directly included in Public Health, could be enlarged upon to the benefit of the community. The management of infancy, the hygiene of the sick-chamber, clothing and personal cleanliness and disinfection. Every district should be persuaded by this educative method, backed up by the force of law, to take an intelligent interest in its own health affairs. The larger problems of Leprosy, Contagious Diseases Acts administration, Plague and Tuberculosis would, at first, be dealt with by the Central Authorities in Cape Town.

It is, however, to the water supply and to disposal of excreta, slop-water and refuse that attention must

first be turned. Except in a few instances the water supply of the Cape Districts is either from wells, (usually shallow), a spring or fountain forming a natural dam, or rain.

In the case of well water, a bucket, or windlass, or an air-motor pump, or a bucket pump worked by mules, is used. In one village where well water was exclusively used I had the well belonging to the schoolhouse cleaned, and took as many of the residents as possible to see the result. The amount of filth which was brought up was amazing. This had the happy result of causing many other owners to cleanse their wells and to take such precautions as banking up the sides above the ground level with masonry and carefully covering in the mouth with planks and iron. I am not able to compare the result with the amount of sickness traceable to contaminated water because I left the place soon after.

In another instance I had the advantage of being one of the first residents in a newly formed village - on the occasion of the opening of a diamond mine. I was on my appointment as Medical Officer to the mine told to busy myself with general sanitary matters. The water available was well water only, and I had wells sunk at suitable places to be used exclusively for drinking and cooking purposes. A layer of coarse gravel was put in at the bottom and over this a layer of sand 2 feet deep. The mouths were most carefully protected. Two coloured men

were stationed there to draw the water by bucket and windlass. No one was allowed to loiter near the well, since loitering invariably means spitting. In addition to this I chose the site of the native location on a spot to leeward of the whites, which afforded some natural drainage. Regulations were drawn up for the natives and fines instituted for infringement. I stayed on the mine 8 months and there was no case of sickness which could even in a remote way be attributed to the water supply. Moreover, I have been in constant communication since - making the time since the start 2 years and 6 months, and they are and have been quite free from any epidemic disease. Municipal regulations then should be framed requiring all owners of wells used for drinking purposes (1) to put a layer of coarse gravel in the bottom of the well covered by a layer of sand, the whole at least 3 feet thick; (2) to have the sides of the well raised above the ground level by means of masonry or some impermeable material; (3) to cover in the top satisfactorily; (4) to have the well periodically cleaned.

In the case of spring water the trouble is in the conveyance to the inhabitants. Usually an open furrow is made along which the water runs as near to the dwellings as possible. This spring water is very common in South Africa, as the number of places whose name ends in "fontein" will show. It is pure and sparkling usually at the source. It is during its transit in the furrow

that it is liable to be, and generally gets, contaminated. The furrow is often full of decaying vegetable matter, and it is a familiar sight to see cattle wading in and drinking from it. Here regulations should be framed to enforce the laying of pipes for the water conveyance, or if that is impossible on the score of expense, then the furrow should be adequately fenced in its entire course and periodically cleansed.

Rain water is only used in very few cases, and beyond exercising supervision over the butts or tanks in which it is stored, nothing is needed.

It is, however, the disposal of excreta and refuse which cause the greatest difficulty in most places. A drainage scheme is usually impossible, and one or other of the dry systems must be resorted to. On the mine mentioned above deep pits were sunk 24 feet and an iron shelter placed round each. In each was placed a keg of Jeyes' Sanitary Powder and scoop which was used by each occupant. After a year's use these pits were to be filled in and others dug. It was not the system I favoured, but the Company adopted it as being the least expensive.

In the former village where I had the school-well cleaned there had been no system. Some houses had a bucket which was emptied only when full to overflowing, and it was emptied about 100 yards away on the veldt where it dried and was dispersed by the daily wind.

Here I had trenches dug in a suitable spot, about $\frac{3}{4}$ mile away, and a cart and 2 men removed the buckets twice a week from every house, emptied them in the trenches, and covered all with a layer of earth. Clean lime-washed buckets were replaced and the emptied ones taken to a shed washed and lime-washed. This entailed a rate upon the householders and caused some opposition, but is now, I understand, working well; but it took me over a year to persuade a majority of the Village Management Board to adopt this system. Such a scheme, though primitive, is preferable to no system at all, and could be made obligatory in many places without any hardship. Household refuse I had burnt. There was a large natural pit near by and all dry refuse was thrown into it and fired. In some places with suitable soil the dry earth closet would be suitable, convenient and cheap, and each municipality must formulate its own scheme.

I had all swine moved from the village to the outlying farms or kraals. The native locations were, however, the greatest obstacle. No one seems to have any jurisdiction over them. I frequently made visits, accompanied by a policeman, and tried to rouse the natives into cleaning up their camp, but I could not get a conviction against those who would not, and the others were not slow to see that I had no legal right in giving them any orders. All I could do was to refuse to visit any hut in the location where there was sickness unless the hut itself and

its surroundings were thoroughly clean. One could always tell the huts where there was any sickness. This location was in striking contrast to the one on the mine where I had the authority of the Company behind me, and anyone not carrying out my orders was dismissed. The natives in the latter place had never lived in such cleanliness and didn't like it, but from an European point of view it was the only native location out of the many I have visited that was not an eyesore and offence.

Every reform that has been made has been due to the energy of the District Surgeon. It is no part of his work, he is not paid for it, and he has no authority; he may see the most outrageous sanitary offences committed and can do nothing to enforce reform, yet by persuasion and importunity he accomplishes a good deal. Our cemetery was a private piece of ground, under the care of no one, and was in a shocking state. After many interviews with the Dutch clergyman I got him to induce the Church to take it over, and since money is always forthcoming for any Church enterprise he was able to have it thoroughly put in order and when I left, it was from an artistic and sanitary aspect a pleasure to visit.

The disposal of slop-water and household refuse consisted of merely throwing these on to the street or front or back garden. The plague of flies which follows this practice must be seen to be believed. No one who has not spent a summer in a South African village can conceive what the

flies are like; they contend for one's food, and their humming in a room necessitates raising one's voice in conversation. Most of the inhabitants when visiting my house remarked upon the freedom from the pest which I enjoyed. I explained that I was careful to throw all my slop-water and refuse into a tin-lined receptacle and have it removed to the rubbish heap every evening. Not even clean water was thrown anywhere near the house. Many adopted this plan with great success until I was able to arrange for suitable treatment of the whole subject with the aid of the Village Management Board. I could have done much more had I been vested with authority or had there been any law under which I could have instituted proceedings against offenders. As it was, only those who could see that the reforms were for their good took the trouble to follow my suggestions.

A P P E N D I X I.

ANNUAL HEALTH REPORTS FROM DISTRICT SURGEONS AND ADDITIONAL DISTRICT SURGEONS.

"Sir,

"I am directed to request you to be good enough to call upon the District Surgeon and Additional District Surgeon (if any) to furnish his Annual Report and Returns upon the state of the public health and sanitation in his district during the year ending on the 31st December.

"The Report and Returns should be prepared and forwarded to this office as soon as possible after the close of the year. The Report should deal with the general health and sanitation of the district, and the returns should furnish information upon the special subjects of Small-pox, Vaccination, the working of 'The Contagious Diseases Prevention Act, 1885,' Leprosy, and persons in receipt of Pauper Relief from Government.

"While the Report, which should be as complete as possible, should be drawn up under the several headings, and in the order indicated below, so as to enable combination and comparison with other districts and with previous years to be made, the District Surgeon is invited to deal as fully as he may deem necessary with any matter which he considers deserving of special attention.

"Should the District Surgeon not have at his disposal the information necessary to enable him to deal properly with a subject under any of the headings, and if you can ascertain the required particulars by correspondence with local or other authorities, or can in any other way assist him, I am to request that you will do so. In every case in which no information can be supplied under a heading, sub-heading or return, 'nil' should be written against it.

"The object aimed at in asking for these reports is to obtain, as far as possible, a complete, comprehensive and connected year's history of the health and sanitary condition of the Colony as a whole, as well as information particular to each district, especially in respect of any deficiency in sanitary control, or the existence of conditions inimical to health.

"The following are the matters which, inter alia, the District Surgeon should treat of, and, in reporting on any sanitary defects that exist and their remedy, he should state the length of time they have continued and the steps, if any, taken by the Local Authority concerned to remove them:-

"(a) The condition of the water supplies, especially as regards their purity both at source and on delivery, their sufficiency, the existence of any causes likely to lead to pollution, either at source or during storage or delivery, and the steps which should be taken for bringing about improvement.

"(b) Sewerage and drainage.

"(c) The collection and disposal of night-soil, slop-water, and household and other refuse.

"(d) Overcrowded dwellings and dwellings unfit for human habitation.

"(e) The management of slaughter-houses, butcheries, bakeries, dairies, and other trades affecting health.

"(f) The sale, storage and preparation of human food.

"(g) The keeping of cattle, swine, and other animals.

"(h) The order, cleanliness, and general sanitation of any Native Location or Camp of Natives under the control of any Local or other Authority within the district.

"(i) Cemeteries and burial grounds.

"(k) The abatement of nuisances generally.

"(l) What hospital accommodation exists in the district for the isolation and treatment of cases of infectious disease, its nature, extent, and to what local authority it belongs.

"(m) The presence or spread of infectious disease, especially Enteric Fever, Diphtheria, and Small-pox.

The account of any outbreak of disease that has occurred in your district during the year should include information as to its situation; dates of its discovery and commencement and of the discovery and discharge of the last case; source of infection and how conveyed; number of persons attacked, with the number of deaths (distinguishing as far as possible between European and Coloured, adults and

"Also the total cost incurred in dealing with any outbreak of Small-pox should be given, distinguishing between that incurred directly by the Local Authority and that incurred directly by the Government.

"With regard to outbreaks of Bubonic Plague, information concerning these is furnished to the Government through special channels, but I shall, nevertheless, be glad if you will supply information on the subject of the precautionary measures adopted in your district, and especially as regards the prevalence of rats and other rodents and the means adopted, and with what success, for their extermination.

"Information is also desired regarding any special prevalence, with the cause, of any of the more unusual diseases, such as Scurvy, Epidemic Pneumonia, and the like.

"The Colonial Secretary wishes me to request you to give this matter your personal attention, in order that the information furnished may be as accurate and complete as possible, and that it may be returned to this office at the earliest possible moment, so that the Annual Report on the Public Health of the Colony may not be unnecessarily delayed.

"I have the honour to be,

"Sir,

"Your obedient Servant,

"NOEL JANISCH,

"Under Colonial Secretary.

..... during the Year ending 31st December, 1903.

Total	100	100	100
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.....1904.

District Surgeon.

..... during the year ending the 31st December, 1905.

A P P E N D I X II.

While it is doubtless true that improved sanitation means decreased incidence of Zymotic disease generally it is not asserted that even a sanitary condition which left nothing to be desired would mean a complete absence of Typhoid Fever.

Enteric Fever is a specific disease, infectious probably only through the excretions. In order to originate a fresh case of the disease it is necessary that some of the living contagium derived from the excretions of one who is sick of the disease shall gain access to the body of a person capable of permitting its development. The vehicles by which the living contagium has been proved to be conveyed to the body are those of water and food. Less fully authenticated means for its transmission are specifically polluted air, personal intercourse and fomites. The part played by flies in conveying the disease to food has been made familiar to all by recent investigations and was no doubt an important factor in the South African campaign. The commonest cause of epidemics of the disease has been abundantly proved to be the water supply - well, stream or water main.

In all cases, epidemic and sporadic, the aetiology should be considered and the source of propagation and dissemination carefully studied. It is the province of Public Health to determine this. Even where the disease

is said to be endemic it is a mistake to suppose that it, like ague, is independent of the movements of human beings. Much can be done to cut short an epidemic and prevent further outbreaks.

In the case of an outbreak at Muzenberg in 12 days 19 cases of Enteric Fever were reported. The milk supply was investigated and infection from this source excluded. The water supply - from the mountains some distance above the Municipality - was, on ordinary occasions, known to be pure, but determined enquiry traced the disease to a Kafir labourer who, suffering from Enteric Fever, had defoecated close to the furrow leading from the reservoir to the intake pipes 9 days before the first case occurred.

In some instances an epidemic may be predicted from the general insanitary state of a place, thus in Hanover, Cape Colony, the District Surgeon had reason to doubt the purity of the water where the inhabitants drew their supply, and he attributed to its use a general outbreak of Gastro-enteritis. So far only a few sporadic cases of Enteric Fever had at that time occurred but he stated that he expected a general outbreak of the disease. A few months later this occurred and no less than 90 cases in a community of 1,215 were reported, and no doubt many more cases among the coloured escaped detection.

The commensal spread of Enteric Fever is exceedingly common in South Africa - the spread of the infection from one to another of the inmates of a house owing to the

absence of proper cleanliness and the failure to take adequate precautions. I have in three years seen four instances of this:

- (1) The postmaster and assistant postmaster were affected.
- (2) Man and wife.
- (3) Two sisters and a brother.
- (4) Two people, not relations, in the same house.

All these were in sequence - not affected at the same time but undoubtedly "caught" one from the other. In the case of No 1 and 4 the originator recovered and the second attacked died.

In one instance, not under my own observation, as many as six cases occurred in one household in 2 months.

One of the most important duties falling upon Local Authorities is the efficient disinfection of clothing, bedding and other articles which have been exposed to infection. For large Urban areas probably the best form is steam pressure - The "Equifex" or "Washington-hyon." For smaller areas the "Thresh" disinfecter is well suited.

It is those isolated cases which occur from time to time, in season and out of season, in communities where there has perhaps been no case for years and which are not imported from elsewhere that cause the greatest trouble to those who are anxious to find out the cause of any case of infectious disease. Every practitioner is familiar with these instances. I have had many and have sought

hard to find out why the patient should have had Enteric Fever at that particular time and why he alone is affected. But while it is true that often a satisfactory solution is not attainable, it is only a reprehensible laxness which allows these isolated cases to become the starting point of an epidemic. Thorough disinfection of all excreta, especially of the faeces before they are buried, of the clothing, bedding and room, and of all contacts reduces the risk in proportion to the thoroughness of the disinfection while in deference to the researches of Horton-Smith on the urine of Enteric Fever patients, as promulgated in his Goulstonian Lectures, urotrophine may be given to kill many of the bacilli in situ and minimise the chance of infection from this source.

A P P E N D I X III.

Extracts from District Surgeons' Reports contrasting satisfactory and unsatisfactory conditions of Public Health in relation to sanitary status.

Place & Population.	Water.	Sanitation generally.	Remarks of District Surgeon.
Bathurst. 9,973.	Rain stored in tanks.	Every effort is made to abate nuisances by the Ranger. The night-soil is buried by a contractor in a suitable place. Butcheries and bakeries. Well kept Locations are exemplary and under control of Inspector. Milk has improved in quality and means of conveyance.	There were 3 cases of Enteric Fever, two of which were introduced and one originated. 3 cases Diphtheria Small Pox 28. 3,000 persons were vaccinated mostly primarily.
Beaufort West. 9,961.	Scarce.	Defects in night-soil removal but improvements have been made. A Location Overseer is appointed. Slaughtering, milk, &c., well managed.	35 cases Enteric Fever as against 86 last year. Diphtheria 21 against 95. These figures are very gratifying.
Caledon. 13,621.	Pure, clean, palatable & brought in pipes.	Night-soil removed in carts and buried 2 miles away. A Sanitary Inspector has been engaged who reports upon nuisances.	No serious outbreak of specific infectious or zymotic disease has occurred. Enteric Fever occurs now

Place & Population.	Water.	Sanitation generally.	Remarks of District Surgeon.
Cres. 6,416.	Great improvement.	Natural river drainage. Night-soil is buried outside the town and is a decided improvement on the old pernicious practice. Household refuse regularly removed. Locations are bad.	and then. This exemption is doubtless due to the excellent water supply and natural drainage. Enteric Fever 11 cases, 3 from a distant farm. All were sporadic, source of infection obscure. 1 Diphtheria.
Clanwilliam. 9,211.	Furrow has been fenced.	Municipal scheme has been established for removal of night-soil and slop-water. Location improved.	Very free from infectious disease. A few cases occurred: until February I could not trace it to water or milk.
Colesberg. 9,859.	Good & sufficient pipes & hydrants.	Night-soil and slops removed by contractor, no overcrowding. Slaughter-houses, bakeries, &c., in perfect sanitary condition. Location very clean. There are no nuisances.	2 or 3 cases Enteric Fever. The District has been very free of this disease. 1 case Small Pox - imported.
Hope Town. 5,776.	Very good pipes.	Bucket system answers very well. No swine or cattle allowed in village.	No Enteric Fever. 3 Diphtheria.
Jansenville. 10,307.	Good.	Sanitary Inspector. No nuisances.	Enteric Fever very few. Small Pox 103. District was badly vaccinated: infection is carried from farm to farm.
Kuruman. 12,909.	River water remarkably free from organic impurities.	^{slops} Night-soil & thrown on veldt at some distance or buried. Location huts overcrowded.	There were no epidemics of infectious disease.

Place & Population.	Water.	Sanitation generally.	Remarks of District Surgeon.
Namaqua-land. 18,017.	Pure at source and delivery.	Generally well looked after.	Few sporadic Enteric Fever: no epidemic.
Prieska. 8,035.	Improved, on the whole very satisfactory. Chance of contamination slight.	Removed by Municipality in satisfactory manner.	No Enteric Fever. 8 cases Diphtheria - certainly introduced from other districts.
Riversdale. 12,537.	No pollution at source or in transit.	Night-soil, refuse, &c., efficiently removed. 2 Sanitary Inspectors. Some Colored overcrowding. No cause for complaint about nuisances generally.	Few isolated Enteric Fever. Diphtheria due to climatic conditions but never in epidemic form.
Grellenbosch. 17,525.	Best watered district in Colony. The quality is of the purest. From river in pipes.	Since the adoption of better sanitation there has been no Enteric Fever.	General health has been excellent: no epidemics.
Swellendam. 12,566.	Good & pure.	Night-soil removed to safe distance and buried.	No epidemic.
Vryburg. 17,973.	Good quality and not liable to pollution.	Dry earth system removed and buried.	Few cases Enteric Fever. Mild type.
Calvinia. 10,867.	Bad and polluted.	Bad generally.	Never free from Enteric Fever for 9 years. 13 deaths from Enteric Fever and 45 deaths from Diphtheria in the year.
Kenhardt. 6,173.	Bad, all kinds of filth in wells.	No method.	Enteric Fever 12. Diphtheria 5 - "but I am certain many more cases occurred."
Fraserburg. 6,615.	Contaminated in transit.	Bad & imperfect and people negligent.	67 deaths from infectious diseases.

Place & Population.	Water.	Sanitation generally.	Remarks of District Surgeon.
Middelburg. 14,911.	Bad.	No scheme of sanitation. Night-soil, &c., a serious menace.	Enteric Fever 40 - traceable to water. Death rate is 57 per 1,000. Infantile rate from diarrhoea and pneumonia 108 per 1000.
Murraysburg. 4,041.	Same unsatisfactory state.	Cesspools, slops thrown in gardens.	Diphtheria 27. Enteric Fever 5.
Paarl. 25,918.	Polluted.	No improvement, slops thrown in the open. People live in filth & the houses smell like corpses in decomposition.	Enteric Fever raging. Diphtheria prevalent & Small Pox broke out in 5 places.
Wellington. 5,000.	22 cases of Enteric Fever 18 of which could be traced to drinking water from open furrows - 11 cases occurring in houses using the same water supply.		
Peddie. 18,114.	Dangerous habit of using contaminated water still continues.	Cesspools - plague of flies.	Enteric Fever 13. Small Pox widespread epidemic.
Phillipstown. 5,803.	Same unsatisfactory state.	No system - plague of flies.	Large number of cases of dysenteric diarrhoea.
Laingsburg.	Polluted wells.	Sanitary matters neglected - inefficient and disgusting. Every hut in the location is unfit for habitation.	Enteric Fever 15 - all drinking water from one sluit. Epidemic of diarrhoea.
Tarka. 8,381.	Contaminated furrows.	Bad.	Enteric Fever 6 - traceable to water. Epidemic of diarrhoea.
Victoria West. 6,987.	Eleven cases of Enteric Fever reported. polluted water supply exists there is no the cause of the disease.		Whilst the present difficulty in tracing